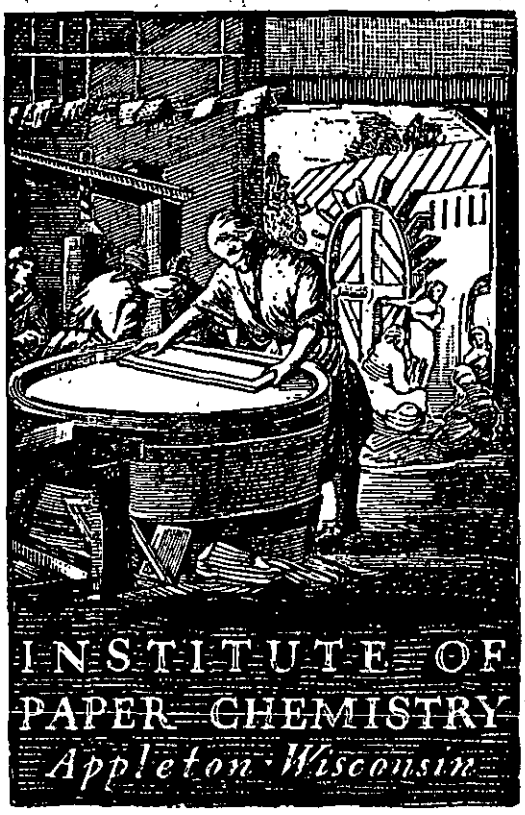

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Progress Report 53

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

November 1, 1959

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

PURPOSE OF THIS STUDY

The purpose of this study is to provide a continuous evaluation of the quality and runability of corrugating medium produced by members of the Fourdrinier Kraft Board Institute. The study, as it progresses, is accumulating a backlog of data and experience which provides two important benefits. First, it enables each participant to evaluate his position in relation to the rest of the industry. Second, it provides background information essential for the judicious interpretation of any proposed specifications on corrugating medium (on either a company or industry basis).

PROCEDURE FOR PARTICIPATING

The procedure for participating in this study involves the submission of two rolls of corrugating medium per week from each machine to The Institute of Paper Chemistry. These rolls are taken from regular production runs on <u>different</u> days. Each roll is 10 to 12 inches wide and contains approximately 5,000 lineal feet of medium (approximately 30 inches in diameter). When received by the Institute, each roll is assigned a code letter and number. The rolls are numbered in the sequence in which they are received. Code letters are assigned on the basis of machines, and a given machine is assigned a different code letter each month in order to mask the identity of the mills. For purposes of reference, an outline of this program which describes the necessary instructions for sampling was appended to Progress Report One in this series.

PRESENTATION AND DISCUSSION OF TEST RESULTS OBTAINED AT

THE INSTITUTE OF PAPER CHEMISTRY

During the month of October, one hundred and one rolls of corrugating medium were selected from the production of seventeen machines and submitted to The Institute of Paper Chemistry for evaluation. A tabulation of the number of rolls submitted from each machine is given in Table I.

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), Concora flat crush (tested immediately after fluting), H. and D. flat crush (single-faced board), and runability. Concora flat crush results obtained on specimens tested immediately after fluting were included for the first time in Progress Report 4. Runability was measured by corrugating each roll under standardized conditions on the Institute's corrugator into A-flute board at 600 feet per minute with minimum tension. If unsatisfactory runability occurred at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runability was obtained (no ruptured flutes). If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch.

Flat crush was determimed on the board obtained at a speed of 600 f.p.m. with minimum tension. In addition to information about quality, these results will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

TABLE I

NUMBER OF ROLLS OF CORRUGATING MEDIUM SUBMITTED

FOR EVALUATION FROM EACH MACHINE

Machine Code	Number of Rolls
A	1
B	9
C	4
D	4
E	4
F	8
G	14
H	2
I	8
J	10
K	4
L	8
M	2
N	4
O	4
P	6
Q	9
Total	101

As requested by members of the F.K.B.I., the Concora medium test results are calculated on the basis of pounds of load per unit area rather than on the basis of the formula suggested by the Concora manufacturer and are reported as Concora flat crush test results. In Progress Reports One and Two, the Concora medium test results were reported on the basis of the formula suggested by the Concora manufacturer.

The average test results obtained on the rolls of corrugating medium submitted by each participant (current machine averages) are shown in Table II and graphically presented in Figures 1 to 5. In addition to a comparison of the test data obtained for the various machines, Table II also presents the current F.K.I. averages, cumulative F.K.I. averages, and the F.K.I. indexes. The current F.K.I. average is the average of test results for all machines participating in the study during the current month. The cumulative F.K.I. average is based on the results for the previous twelve-month period excluding the result for the current period. The F.K.I. index is obtained as follows:

$$\frac{\text{current F.K.I. average}}{\text{cumulative F.K.I. average}} \times 100 = \text{F.K.I. index (\%)}$$

The F.K.I. index provides a ready means of comparing the current quality with previous results. An index greater than 100% indicates that current quality is higher than the average result for the previous twelve periods; an index below 100% indicates that current quality is lower than the average result for the previous twelve periods.

TABLE II

SUMMARY OF CURRENT MACHINE AVERAGES
October, 1959

Mill Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i. (Conditioned)	Concora Flat Crush, p.s.i. (Tested Immediately)	Single-Face Flat Crush, p.s.i.
A	28.7	10.1	42.6	53.2	37.8
B	26.9	10.8	37.0	47.5	33.4
C	25.9	9.6	32.6	39.4	29.4
D	26.6	10.1	35.8	48.1	31.8
E	26.7	10.2	36.2	47.8	33.2
F	27.1	9.5	35.4	44.0	33.0
G	26.5	10.7	35.3	45.6	32.9
H	27.9	12.0	38.4	50.2	32.1
I	27.0	10.9	39.4	49.9	35.4
J	27.4	10.0	39.8	52.0	35.4
K	27.4	9.3	31.7	35.2	26.8
L	27.0	9.5	34.1	43.8	31.9
M	26.6	10.7	32.3	43.7	29.6
N	27.3	10.5	32.8	44.0	30.5
O	26.4	9.6	34.3	43.0	31.5
P	27.2	10.7	39.0	49.3	34.7
Q	29.2	10.6	37.4	47.2	33.3
Current F.K.I. Average	27.2	10.3	36.1	46.1	32.5
Cumulative F.K.I. Average	27.1	10.2	36.9	47.3	33.0
F.K.I. Index, %	100.1	101.0	97.9	97.6	98.6

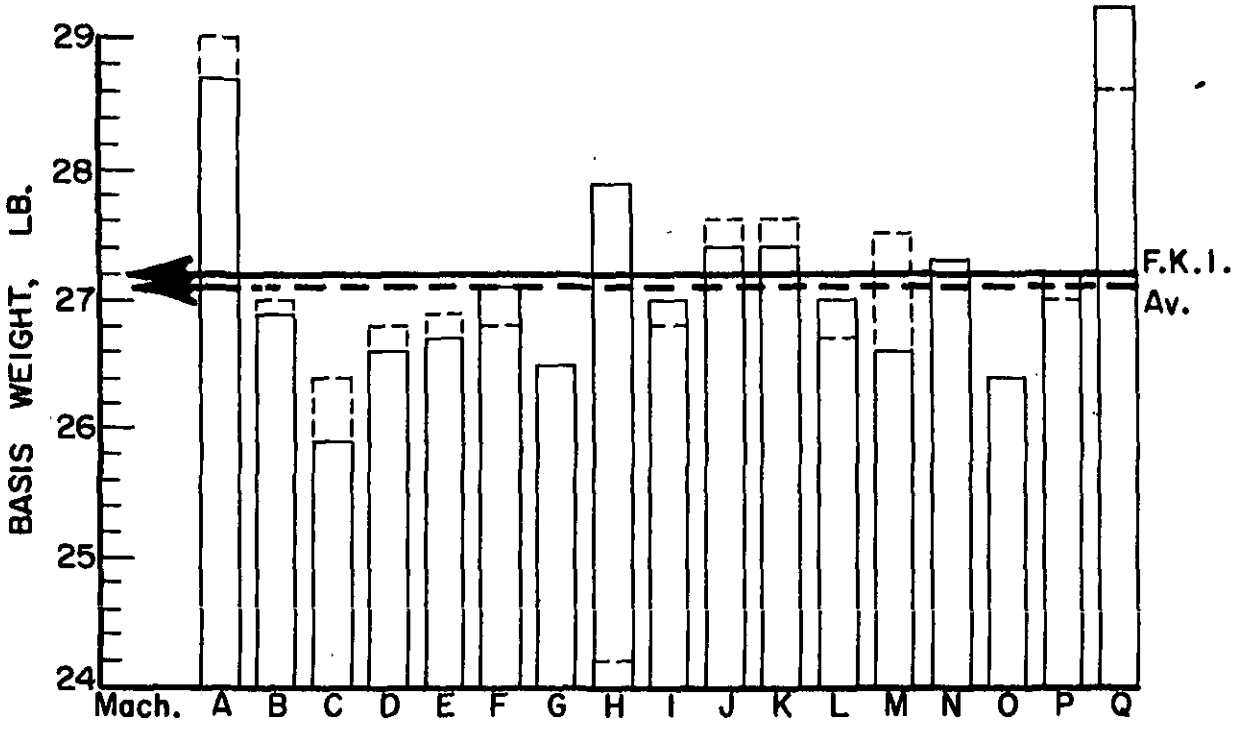

Figure 1

Comparison of Basis Weight Results for October, 1959

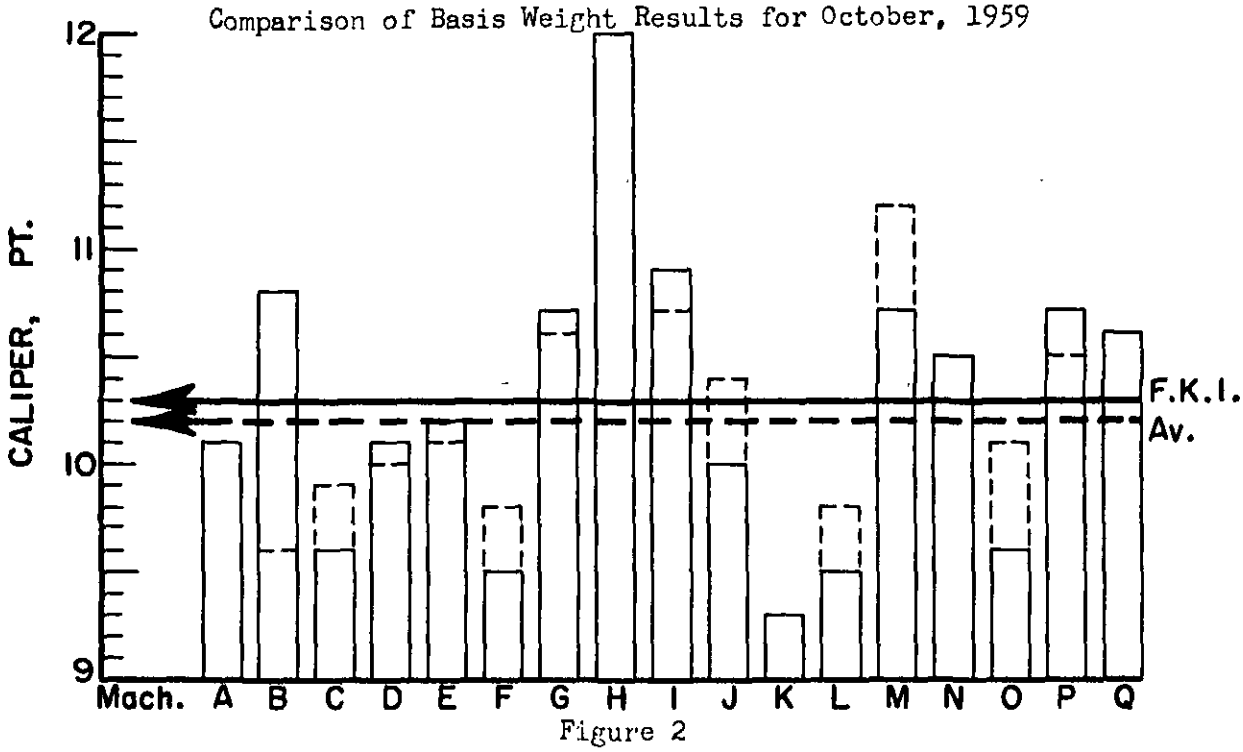

Figure 2

Comparison of Caliper Results for October, 1959

——— Current machine average

- - - - - Cumulative machine average

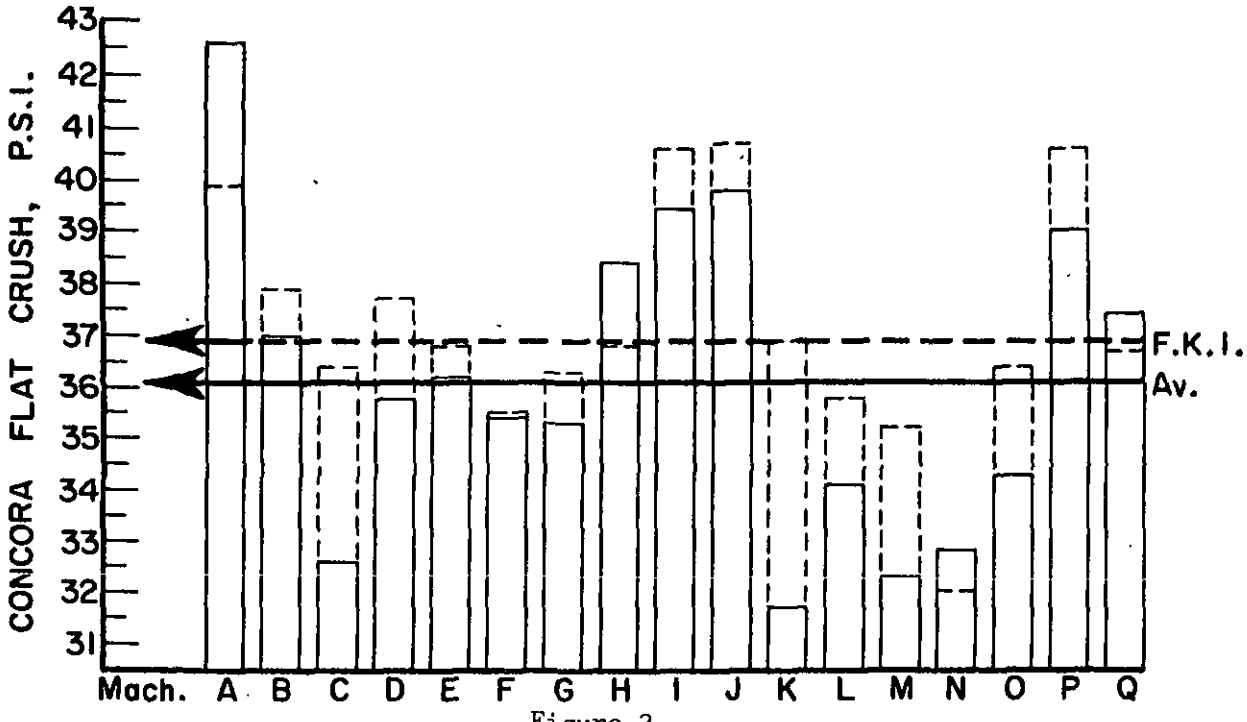

Figure 3

Comparison of Concora Flat Crush Results (Conditioned) for October, 1959

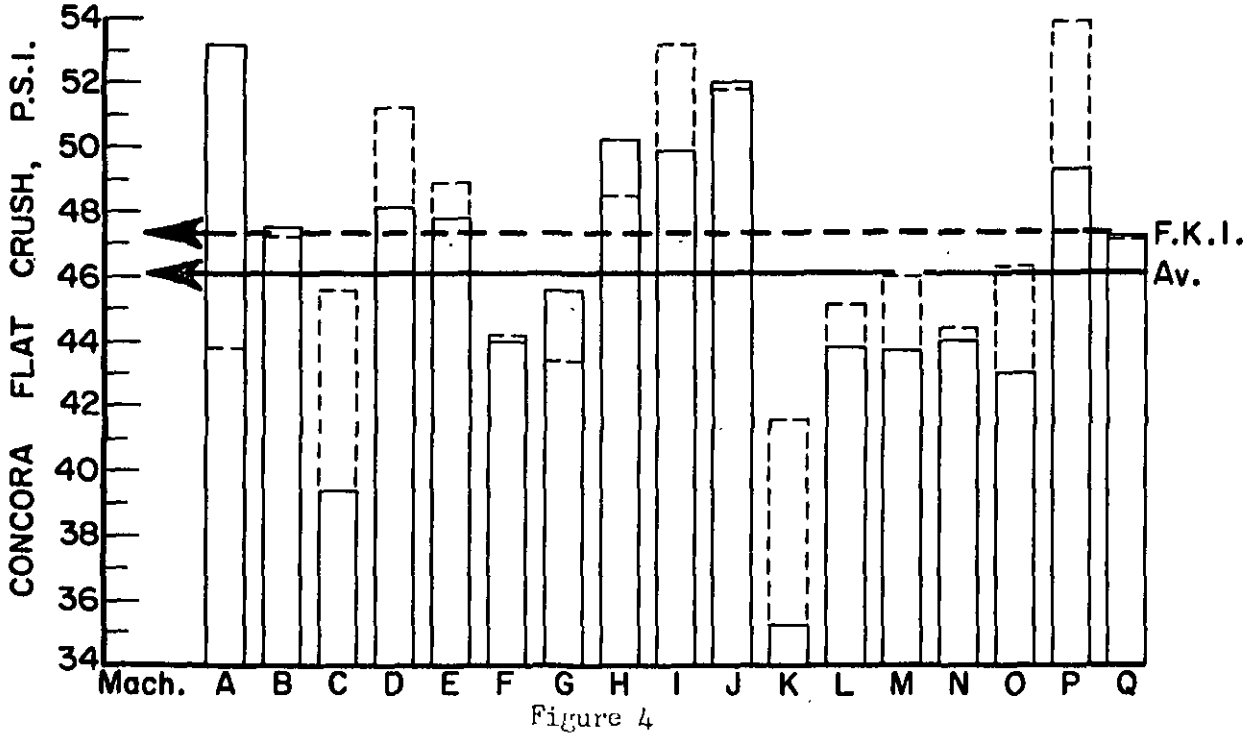

Figure 4

Comparison of Concora Flat Crush Results (Tested Immediately) for October, 1959

——— Current machine average

– – – – – Cumulative machine average

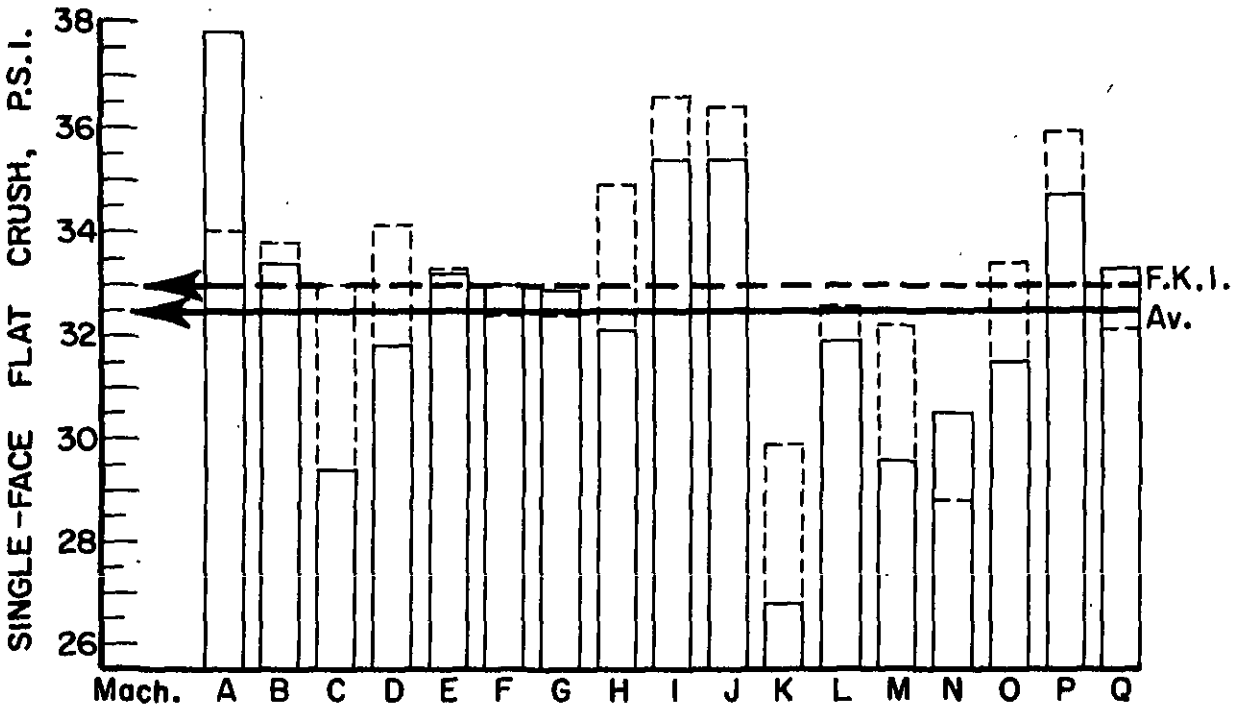

Figure 5

Comparison of Single-Face Flat Crush Results for October, 1959

——— Current mill average

- - - - - Cumulative mill average

In Table II the current machine averages for the month of October are summarized. It may be noted in Table II and Figure 1 that basis weight varied from a low of 25.9 lb. for Machine C to a high of 29.2 lb. for Machine Q. The current F.K.I. average for basis weight was 27.2 lb., which was slightly higher than the cumulative F.K.I. average of 27.1 lb. Of the current machine averages shown in Table II, only the average for Machine C was below the 26-lb. minimum requirement of Rule 41. On the basis of individual rolls, it may be noted that the tabulated data for each machine shown in Tables III through XIX included only five basis weight averages which were below 26 lb.

With regard to the caliper results for the current period, it may be seen in Table II and also in Figure 2 that the lowest average caliper data of 9.3 points was associated with Machine K and the highest average of 12.0 points with Machine H. The current F.K.I. average of 10.3 points was slightly higher than the cumulative F.K.I. average of 10.2 points. The minimum caliper requirement of nine points specified in Rule 41 was met by all participants on the basis of the current machine averages shown in Table II. This observation also applied to the averages for individual rolls.

The Concora flat crush averages obtained on specimens conditioned after fluting are presented graphically in Figure 3 based on the data in Table II. An inspection of these results reveals that 42.6 p.s.i. was the highest average and 31.7 p.s.i. the lowest. Machine A had the highest average and Machine K the lowest. The current F.K.I. average of 36.1 p.s.i. was slightly lower than the cumulative F.K.I. average of 36.9 p.s.i.

The Concora flat crush averages obtained on specimens tested immediately after fluting are shown graphically in Figure 4 and were obtained from Table II. Machine A had the highest average of 53.2 p.s.i. and Machine K the lowest average of 35.2 p.s.i. The current F.K.I. average was 46.1 p.s.i. which was slightly lower than the cumulative F.K.I. average of 47.3 p.s.i.

The highest single-face flat crush average of 37.8 p.s.i. was obtained for Machine A and the lowest of 26.8 p.s.i. for Machine K. These data are shown in Table II and are presented graphically in Figure 5. The current F.K.I. average was 32.5 p.s.i., whereas the cumulative F.K.I. average was 33.0 p.s.i.

For the current period, the current F.K.I. averages for basis weight and caliper were higher than their respective cumulative F.K.I. averages, and the current F.K.I. averages for Concora flat crush (conditioned), Concora flat crush (tested immediately), and single-face flat crush were lower than their respective cumulative F.K.I. averages.

The test results obtained on the sample lots submitted from the production of each of the machines are shown in Tables III through XIX for Machines A through Q, respectively. The maximum, minimum, and average test results obtained on each sample lot are shown for all tests except basis weight for which only the average is shown; in addition, the over-all average result for all sample lots submitted from a given machine is shown for each test. The latter over-all averages are reported as "current machine averages." A cumulative machine average is also shown and is calculated by averaging

the current machine averages for the previous twelve periods (excluding the current period). Also shown for each machine in Tables III to XIX are the machine factor and machine index which are defined as follows:

$$\frac{\text{current machine average}}{\text{cumulative machine average}} \times 100 = \text{machine factor (\%)}$$

$$\frac{\text{current machine average}}{\text{cumulative F.K.I. average}} \times 100 = \text{machine index (\%)}$$

The machine factor and machine index provide a means for comparing the current machine average with either the previous results for that particular machine or with the cumulative results for all machines--i.e., the cumulative F.K.I. average.

TABLE III

SUMMARY OF TEST RESULTS FOR MACHINE A
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
A-1	9-17-59	10- 5-59	177	28.7	10.5	9.9	10.1	47.4	37.8	42.6	57.6	48.0	53.2	38.8	36.6	37.8	Note a
Current Machine Average				28.7			10.1			42.6			53.2			37.8	
Cumulative Machine Average				29.0			10.1			39.9			43.8			34.0	
Machine Factor, %				98.9			100.0			106.8			121.5			110.9	
Machine Index, %				105.7			99.2			115.4			112.5			114.5	

TABLE IV

SUMMARY OF TEST RESULTS FOR MACHINE B
October, 1959

B-1	9-19-59	9-28-59	312	25.7	12.0	10.0	11.0	39.6	36.0	37.4	45.0	42.0	43.3	33.6	30.2	31.9	1-1/2
B-2	9-20-59	9-23-59	313	25.8	11.8	10.7	11.0	37.8	33.0	34.8	48.0	43.2	46.0	35.0	31.4	33.0	1-1/2
B-3	9-21-59	9-28-59	314	26.9	11.5	10.4	10.8	40.8	37.8	39.5	54.6	49.2	51.5	36.8	35.2	36.2	1-1/2
B-4	10-3-59	10-12-59	315	26.8	12.0	9.2	10.4	36.6	34.2	35.9	48.0	45.0	47.0	34.6	31.4	33.4	1-1/2
B-5	10-4-59	10-12-59	316	27.1	12.7	10.0	11.0	42.6	39.6	41.0	58.8	49.8	53.0	36.4	32.4	34.8	1-1/2
B-6	10-4-59	10-12-59	317	27.9	12.1	10.3	11.1	42.0	36.6	39.7	55.2	48.6	51.5	37.0	34.0	35.2	1-1/2
B-7	10-7-59	10-20-59	318	26.9	11.3	10.3	10.8	36.0	33.6	34.9	46.2	36.6	42.8	32.4	30.0	31.4	1-1/2
B-8	10- 7-59	10-20-59	319	26.7	11.6	10.1	10.8	36.0	34.2	34.8	48.0	40.8	45.4	32.4	28.4	30.9	1-1/2
B-9	10-8-59	10-20-59	320	28.1	11.1	10.1	10.6	36.6	33.6	35.0	49.2	43.2	46.6	35.0	31.4	33.3	1-1/2
Current Machine Average				26.9			10.8			37.0			47.5			33.4	
Cumulative Machine Average				27.0			9.6			37.9			47.2			33.8	
Machine Factor, %				99.6			112.8			97.7			100.6			98.7	
Machine Index, %				99.0			106.4			100.3			100.4			101.2	

[a] Maximum speed at minimum tension for this roll was 200 f.p.m.

TABLE V

SUMMARY OF TEST RESULTS FOR MACHINE C
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
C-1	9-24-59	10- 5-59	20G	26.1	9.8	9.7	9.8	33.0	30.0	30.7	39.6	35.4	38.0	28.4	27.6	27.8	1
C-2	10-1-59	10-5-59	20G	26.1	10.0	9.7	9.9	34.2	30.6	32.0	45.0	37.8	40.0	33.2	30.2	31.2	1-1/2
C-3	10-7-59	10-21-59		25.9	9.8	9.3	9.6	37.2	30.6	33.8	43.2	35.4	39.7	31.2	23.0	30.2	1
C-4	10-13-59	10-21-59		25.6	9.4	9.1	9.2	34.2	32.4	33.6	41.4	38.4	39.7	29.0	27.8	28.4	1-1/2
Current Machine Average				25.9			9.6			32.6			39.4			29.4	
Cumulative Machine Average				26.4			9.9			36.4			45.6			33.0	
Machine Factor, %				98.2			96.8			89.4			86.2			89.0	
Machine Index, %				95.5			94.3			88.2			83.3			89.2	

TABLE VI

SUMMARY OF TEST RESULTS FOR MACHINE D
October, 1959

D-1	9-24-59	10- 5-59	20G	27.4	10.3	10.0	10.1	33.4	36.6	37.6	53.4	48.0	51.8	33.4	31.8	32.6	1/2
D-2	10-2-59	10- 5-59	20G	26.3	10.0	9.8	10.0	36.0	34.8	35.6	54.0	46.2	49.4	35.0	31.4	33.1	1
D-3	10- 9-59	10-21-59		26.2	10.5	10.1	10.3	37.2	33.0	34.8	51.0	45.6	47.5	31.2	30.0	30.8	min.
D-4	10-15-59	10-21-59		26.8	10.5	10.1	10.3	36.6	33.6	35.0	47.4	40.8	43.7	31.4	30.4	30.8	1-1/2
Current Machine Average				26.6			10.1			35.8			48.1			31.8	
Cumulative Machine Average				26.8			10.0			37.7			51.2			34.1	
Machine Factor, %				99.3			101.6			94.8			94.0			93.4	
Machine Index, %				98.1			99.5			96.9			101.8			96.5	

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE E
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
E-1	9-14-59	9-28-59	204	27.3	9.9	8.9	9.4	41.4	33.0	37.7	53.4	49.8	51.8	35.8	34.4	35.2	1-1/2
E-2	9-15-59	9-28-59	205	26.8	10.3	10.0	10.1	39.0	34.8	37.2	53.4	45.6	48.8	36.4	33.0	34.8	1-1/2
E-3	9-30-59	10-14-59	206	26.5	11.0	10.4	10.7	37.8	33.0	35.0	46.8	43.8	45.0	33.4	30.2	31.6	1-1/2
E-4	10-2-59	10-14-59	207	26.3	11.0	10.5	10.8	37.2	31.8	34.7	46.2	45.0	45.6	32.2	29.8	31.2	1-1/2
Current Machine Average				26.7			10.2			36.2			47.8			33.2	
Cumulative Machine Average				26.9			10.1			36.8			48.9			33.3	
Machine Factor, %				99.4			101.7			98.3			97.7			99.6	
Machine Index, %				98.5			100.6			98.0			101.2			100.7	

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE F
October, 1959

F-1	9- 1-59	9-29-59	35	27.8	10.0	9.7	9.8	40.2	34.8	36.7	52.8	42.0	47.9	37.0	34.2	35.8	1-1/2
F-2	9- 2-59	9-29-59	107	26.0	9.9	9.5	9.8	34.2	33.0	33.5	44.4	42.0	43.3	32.2	28.4	30.4	1-1/2
F-3	9- 4-59	10-9-59	288	27.1	10.0	9.2	9.4	40.2	30.6	34.8	46.2	40.2	41.4	33.0	31.4	32.2	1-1/2
F-4	9- 9-59	10-9-59	709	26.2	10.0	9.0	9.6	36.6	33.6	34.9	46.8	36.0	40.0	35.4	33.0	34.3	1-1/2
F-5	9-17-59	10-9-59	1333	27.4	10.0	9.4	9.7	37.8	32.4	34.7	47.4	42.6	44.6	36.4	31.6	34.8	1-1/2
F-6	9-19-59	10-13-59	1439	27.9	9.7	9.0	9.5	40.8	33.0	36.7	54.0	43.2	48.6	35.2	31.8	33.3	1-1/2
F-7	9-22-59	10-13-59	1713	27.3	9.3	8.8	9.1	38.4	35.4	36.7	47.4	35.4	43.2	32.6	29.6	31.2	1-1/2
F-8	9-28-59	10-20-59	2209	27.0	9.6	9.1	9.4	36.0	33.6	34.8	46.8	39.6	42.7	33.4	30.4	31.8	1-1/2
Current Machine Average				27.1			9.5			35.4			44.0			33.0	
Cumulative Machine Average				26.8			9.8			35.5			44.2			32.4	
Machine Factor, %				101.0			97.0			99.5			99.4			101.8	
Machine Index, %				99.8			93.4			95.8			93.0			100.0	

TABLE IX

SUMMARY OF TEST RESULTS FOR MACHINE G
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
G-1	6-26-59	9-30-59	21	26.2	11.4	10.4	10.8	36.6	30.0	33.1	46.8	40.2	42.4	32.4	30.2	31.4	1
G-2	8- 3-59	9-30-59	28	26.7	10.9	10.4	10.7	38.4	33.6	36.5	48.0	39.0	43.2	35.2	32.6	34.4	1-1/2
G-3	8- 6-59	9-30-59	29	26.9	11.0	10.5	10.8	37.2	34.8	35.9	50.4	43.2	47.6	35.0	31.0	32.8	1-1/2
G-4	8-10-59	9-30-59	30	26.6	10.9	10.5	10.8	37.2	34.2	35.6	49.2	43.2	46.2	33.4	30.2	31.5	1-1/2
G-5	8-14-59	9-30-59	31	26.1	10.9	10.2	10.6	40.2	33.0	37.0	55.2	46.8	49.1	36.2	33.8	34.8	1-1/2
G-6	8-21-59	9-30-59	32	26.2	10.9	10.3	10.7	37.8	33.0	35.4	45.0	40.8	42.8	34.0	30.6	32.6	1-1/2
G-7	8-28-59	9-30-59	33	26.8	10.9	10.6	10.8	36.6	34.8	36.0	55.2	46.8	49.8	35.4	33.0	33.8	1-1/2
G-8	8-31-59	9-30-59	34	26.0	11.0	10.2	10.6	36.6	33.6	34.7	46.2	42.6	44.3	34.6	30.0	33.2	1-1/2
G-9	9- 2-59	9-30-59	35	26.0	10.9	10.4	10.7	36.0	30.0	31.8	46.8	36.0	40.7	32.6	28.0	31.2	1-1/2
G-10	9- 9-59	9-30-59	36	26.8	11.2	10.5	10.9	40.8	34.8	37.7	51.0	37.2	45.8	35.2	33.2	34.2	1
G-11	9-11-59	9-30-59	37	27.0	10.9	10.4	10.6	38.4	34.8	36.6	49.8	43.8	47.0	35.4	32.2	33.8	1-1/2
G-12	9-14-59	9-30-59	38	26.7	11.5	11.0	11.2	36.0	31.2	33.5	46.8	42.0	45.0	32.4	29.6	31.2	1-1/2
G-13	9-16-59	9-30-59	39	26.1	10.8	10.0	10.4	35.4	31.2	33.6	47.4	39.6	44.5	34.2	30.8	31.9	1-1/2
G-14	9-22-59	9-30-59	40	26.8	10.9	10.2	10.5	39.0	36.6	37.6	52.8	48.0	50.2	35.8	34.0	34.7	1-1/2
Current Machine Average				26.5			10.7			35.3			45.6			32.9	
Cumulative Machine Average				26.5			10.6			36.3			43.4			32.4	
Machine Factor, %				100.0			100.9			97.3			105.0			101.7	
Machine Index, %				97.6			105.2			95.8			96.5			99.9	

TABLE X

SUMMARY OF TEST RESULTS FOR MACHINE H
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
H-1		10-11-59	1	26.8	12.7	11.2	11.8	39.6	36.0	37.7	49.8	42.0	46.2	31.2	29.8	30.9	1-1/2
H-2		10-20-59	2	29.0	12.6	11.4	12.1	40.8	37.2	39.1	57.0	51.0	54.1	34.6	31.4	33.2	1-1/2
Current Machine Average				27.9			12.0			38.4			50.2			32.1	
Cumulative Machine Average				24.2			10.3			36.8			48.5			34.9	
Machine Factor, %				115.5			116.3			104.4			103.3			92.0	
Machine Index, %				102.8			117.5			104.1			106.1			97.3	

TABLE XI

SUMMARY OF TEST RESULTS FOR MACHINE I
October, 1959

I-1	9-22-59	9-28-59	506	27.5	10.7	9.5	10.2	43.8	42.0	42.7	55.2	48.0	53.0	39.6	37.6	38.6	1-1/2
I-2	9-25-59	9-29-59	507	26.5	11.?	10.2	10.7	39.0	34.8	36.8	50.4	42.6	45.0	37.6	33.8	35.9	1-1/2
I-3	9-30-59	10-5-59	508	27.3	12.2	10.8	11.4	42.6	37.8	40.3	57.0	47.4	49.8	36.6	34.4	35.3	1-1/2
I-4	9-30-59	10-5-59	509	27.5	12.2	11.0	11.4	41.4	37.2	39.2	57.0	46.2	50.5	36.0	34.4	35.7	1-1/2
I-5	10-7-59	10-12-59	510	27.1	11.5	10.3	10.9	42.0	37.2	39.7	54.0	47.4	50.2	35.6	32.4	34.0	1-1/2
I-6	10-9-59	10-14-59	511	27.0	12.0	10.7	11.3	37.2	36.0	36.8	52.8	48.0	50.6	34.8	32.0	33.2	1-1/2
I-7	10-14-59	10-20-59	512	26.6	11.6	10.4	11.0	43.8	36.0	39.4	49.8	42.0	47.5	35.8	34.6	35.2	1-1/2
I-8	10-16-59	10-20-59	513	26.5	10.9	10.0	10.5	42.6	37.2	40.4	58.2	48.0	52.6	38.6	33.8	35.2	1-1/2
Current Machine Average				27.0			10.9			39.4			49.9			35.4	
Cumulative Machine Average				26.8			10.7			40.6			53.2			36.6	
Machine Factor, %				100.7			102.1			97.0			93.9			96.8	
Machine Index, %				99.5			107.3			106.9			105.6			107.3	

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE J
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
J-1	9- 8-59	9-28-59	344	27.5	10.0	9.7	9.8	39.0	36.0	37.4	56.4	49.2	53.5	35.6	32.4	34.3	1-1/2
J-2	9-11-59	9-28-59	345	27.9	11.0	9.9	10.6	42.0	37.2	39.2	55.8	46.2	50.9	36.6	35.4	36.0	1-1/2
J-3	9-15-59	9-28-59	346	28.4	10.0	9.2	9.8	45.0	39.0	41.8	59.4	49.2	55.6	37.6	34.0	35.5	1-1/2
J-4	9-17-59	9-29-59	347	27.0	10.2	9.9	10.0	43.2	39.0	41.0	52.8	46.8	49.4	38.0	36.0	37.2	1-1/2
J-5	9-22-59	10-13-59	348	26.9	10.4	9.8	10.0	42.0	39.6	40.7	55.8	51.0	52.8	35.6	34.8	35.2	1-1/2
J-6	9-26-59	10-13-59	349	27.5	10.7	9.5	10.1	42.6	40.2	41.4	56.4	49.8	53.8	39.0	35.6	37.2	1-1/2
J-7	9-29-59	10-13-59	350	27.4	10.1	9.5	9.9	41.4	38.4	39.6	55.2	51.0	52.8	36.4	33.8	35.2	1-1/2
J-8	10-1-59	10-13-59	351	27.2	10.3	9.8	10.0	42.6	36.6	40.0	55.8	49.8	52.4	34.4	33.4	34.0	1-1/2
J-9	10-6-59	10-20-59	352	26.9	10.8	10.0	10.2	40.8	37.2	38.5	56.4	47.4	50.4	37.4	35.0	36.0	1-1/2
J-10	10-9-59	10-20-59	353	27.9	10.2	9.7	9.9	39.0	37.2	38.3	50.4	46.8	48.7	33.6	32.6	33.2	1-1/2
Current Machine Average				27.4			10.0			39.8			52.0			35.4	
Cumulative Machine Average				27.6			10.4			40.7			51.8			36.4	
Machine Factor, %				99.3			96.2			97.7			100.5			97.3	
Machine Index, %				101.1			98.6			107.8			110.1			107.4	

TABLE XIII

SUMMARY OF TEST RESULTS FOR MACHINE K
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
K-1	9-23-59	10- 5-59	35	27.7	10.0	9.0	9.6	33.6	28.2	30.6	34.2	31.2	33.0	27.8	25.6	26.6	Note a
K-2	9-23-59	10- 5-59	36	26.8	10.3	9.0	9.4	34.2	30.0	31.6	33.6	27.6	31.9	25.0	21.6	23.5	Min.
K-3	10-6-59	10-20-59	37	27.7	9.7	8.6	9.1	37.2	32.4	33.8	39.0	34.8	36.5	29.0	27.8	28.5	Min.
K-4	10-6-59	10-20-59	38	27.4	9.6	8.8	9.2	33.0	28.8	30.8	40.8	37.8	39.6	29.6	27.6	28.8	Min.
Current Machine Average				27.4			9.3			31.7			35.2			26.8	
Cumulative Machine Average				27.6			9.3			36.9			41.6			29.9	
Machine Factor, %				99.3			100.0			86.0			84.8			89.8	
Machine Index, %				100.9			91.5			85.9			74.6			81.4	

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE L
October, 1959

L-1	8-31-59	9-29-59	2689	27.8	10.0	9.4	9.8	35.4	31.8	34.2	48.0	45.0	46.6	32.4	31.8	32.0	1-1/2
L-2	9- 3-59	9-29-59	275	26.5	10.0	9.3	9.6	36.6	34.2	35.2	47.4	42.0	45.4	36.0	31.8	33.5	1-1/2
L-3	9- 7-59	10-9-59	618	26.3	10.0	9.1	9.6	35.4	30.6	33.2	49.8	43.2	45.8	31.8	28.6	30.7	1-1/2
L-4	9-16-59	10-13-59	100	26.3	9.4	8.8	9.1	35.4	31.8	34.0	46.2	40.8	43.2	32.0	28.8	30.5	1-1/2
L-5	9-18-59	10-13-59	1486	26.1	9.8	9.3	9.6	36.6	32.4	34.2	45.6	33.6	40.4	35.2	30.0	32.4	1-1/2
L-6	9-24-59	10-20-59	1963	26.7	9.4	8.9	9.2	35.4	31.2	33.1	46.2	40.2	41.9	31.6	27.4	30.1	1-1/2
L-7	9-27-59	10-20-59	2151	27.1	9.3	9.0	9.2	37.2	30.6	34.2	47.4	42.6	44.5	34.0	29.8	32.6	1-1/2
L-8	9-29-59	10-20-59	2327	29.3	10.2	9.6	9.8	36.0	33.6	34.8	46.2	40.2	42.7	34.6	32.0	33.2	1-1/2
Current Machine Average				27.0			9.5			34.1			43.8			31.9	
Cumulative Machine Average				26.7			9.8			35.8			45.1			32.6	
Machine Factor, %				101.1			97.3			95.4			97.2			97.8	
Machine Index, %				99.5			93.1			92.4			92.7			96.7	

[a] Maximum speed at minimum tension for this roll was 575 f.p.m.

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
M-1	10-7 -59	10-12-59	189	26.4	10.9	10.2	10.6	34.8	30.6	32.6	48.0	40.8	44.0	30.4	28.6	29.4	1-1/2
M-2	10- 7-59	10-12-59	190	26.8	11.2	10.3	10.8	33.6	31.2	31.9	48.0	42.0	43.3	31.4	28.6	29.9	1-1/2
Current Machine Average				26.6			10.7			32.3			43.7			29.6	
Cumulative Machine Average				27.5			11.2			35.2			46.0			32.2	
Machine Factor, %				96.9			95.8			91.6			95.0			91.9	
Machine Index, %				98.1			105.1			87.5			92.4			89.9	

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE N
October, 1959

N-1	9-24-59	10- 2-59	185	27.3	10.9	10.4	10.7	36.0	30.0	34.2	50.4	41.4	44.9	31.4	29.6	30.4	1-1/2
N-2	9-24-59	10- 2-59	186	27.2	11.0	10.1	10.7	35.4	30.0	32.2	45.0	38.4	41.2	32.8	29.0	31.4	1-1/2
N-3	10-14-59	10-20-59	191	27.7	10.8	9.8	10.2	36.0	30.6	33.6	49.8	45.6	47.4	31.0	30.4	30.7	1-1/2
N-4	10-14-59	10-20-59	192	27.2	10.5	9.9	10.2	33.6	27.0	31.2	44.4	41.4	42.7	30.8	28.2	29.4	1-1/2
Current Machine Average				27.3			10.5			32.8			44.0			30.5	
Cumulative Machine Average				27.3			10.5			32.0			44.4			28.8	
Machine Factor, %				100.0			100.0			102.6			99.2			105.7	
Machine Index, %				100.7			102.8			88.9			93.2			92.5	

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE O
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
O-1	9-25-59	10- 5-59	20G	26.9	9.6	9.0	9.4	36.6	34.8	36.2	47.4	43.8	45.7	34.8	32.0	33.6	1
O-2	9-30-59	10-5-59	20G	26.3	10.0	9.6	9.8	34.8	30.6	32.6	44.4	37.2	41.2	31.8	29.4	30.4	1
O-3	10-8-59	10-21-59		26.3	10.1	9.8	10.0	38.4	34.2	36.0	45.6	43.2	44.4	34.8	30.4	32.0	1/2
O-4	10-14-59	10-21-59		26.1	9.7	8.9	9.2	33.6	30.6	32.3	43.2	37.8	40.7	31.2	29.2	30.1	1/2
Current Machine Average				26.4			9.6			34.3			43.0			31.5	
Cumulative Machine Average				26.4			10.1			36.4			46.3			33.4	
Machine Factor, %				100.0			95.4			94.3			92.8			94.3	
Machine Index, %				97.2			94.3			92.9			91.0			95.5	

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P
October, 1959

P-1	8-29-59	10- 5-59	880	27.7	10.6	9.4	10.0	50.4	43.8	47.2	68.4	55.8	62.0	43.4	39.2	41.3	Note a
P-2	9-21-59	10- 5-59	592	28.9	12.0	11.5	11.8	39.6	33.6	36.2	45.0	39.6	41.5	30.8	29.2	30.1	1-1/2
P-3	9-24-59	10- 9-59	668	27.7	11.7	10.5	11.0	42.6	37.2	40.0	52.2	45.6	49.2	38.2	35.8	37.1	1-1/2
P-4	9-29-59	10- 9-59	808	27.1	10.9	10.0	10.3	39.6	36.6	37.9	57.0	48.6	51.5	37.4	32.6	34.6	1-1/2
P-5	10-2-59	10-20-59	33	25.1	10.8	10.0	10.4	36.6	33.0	35.2	46.8	41.4	44.6	34.0	29.6	31.8	1/2
P-6	10-3-59	10-20-59	67	26.8	10.9	10.0	10.5	41.4	34.2	37.8	52.2	43.8	46.7	35.2	32.0	33.1	1
Current Machine Average				27.2			10.7			39.0			49.3			34.7	
Cumulative Machine Average				27.0			10.5			40.6			53.9			35.9	
Machine Factor, %				100.9			101.3			96.2			91.4			96.7	
Machine Index, %				100.2			104.8			105.8			104.2			105.1	

a Maximum speed at minimum tension for this roll was 75 f.p.m.

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE Q
October, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
Q-1	9-15-59	9-23-59	270	29.8	11.2	10.7	10.9	40.8	34.8	37.6	50.4	42.6	46.6	35.6	32.6	34.6	1-1/2
Q-2	9-18-59	9-29-59	271	29.4	11.2	10.6	10.8	38.4	32.4	35.4	48.0	45.0	46.3	36.8	33.4	35.1	1-1/2
Q-3	9-23-59	10-5-59	272	28.7	10.8	10.0	10.6	40.8	37.8	38.9	52.8	49.2	50.9	35.4	32.0	33.2	1-1/2
Q-4	9-25-59	10-5-59	273	29.0	11.1	10.0	10.8	42.6	36.0	39.1	54.0	45.6	49.2	34.2	33.4	33.8	1/2
Q-5	10-1-59	10-13-59	274	28.8	10.8	10.1	10.3	40.8	33.6	37.6	46.8	43.2	45.0	32.0	31.0	31.4	1-1/2
Q-6	10-2-59	10-13-59	275	28.9	10.4	9.7	10.1	40.8	36.6	37.6	48.6	42.0	45.5	34.4	30.2	32.4	1-1/2
Q-7	10-7-59	10-15-59	276	29.0	10.8	9.9	10.4	40.2	35.4	37.7	53.4	46.8	50.4	32.8	31.2	32.4	1-1/2
Q-8	10-9-59	10-15-59	277	28.9	11.0	10.0	10.4	38.4	35.4	37.0	47.4	43.2	46.0	34.4	31.4	33.3	1-1/2
Q-9	10-12-59	10-15-59	278	30.4	11.2	10.2	10.8	37.8	34.8	36.0	46.8	41.4	45.1	34.0	32.0	33.2	1
Current Machine Average				29.2			10.6			37.4			47.2			33.3	
Cumulative Machine Average				28.6			10.6			36.7			47.1			32.1	
Machine Factor, %				102.0			100.0			102.0			100.3			103.6	
Machine Index, %				107.6			103.7			101.4			99.9			100.9	

DISCUSSION OF CONCORA FLAT CRUSH TEST RESULTS OBTAINED AT THE INSTITUTE OF PAPER CHEMISTRY AND THOSE OBTAINED AT THE MILLS

In Table XX a comparison of Institute and mill Concora flat crush test results obtained on conditioned specimens is given for the month of October. These comparisons were initiated in Progress Report 30 and permit interested participants to submit their Concora flat crush test results to The Institute of Paper Chemistry so that comparative results may be included in the monthly reports. Data sheets for supplying this information may be obtained from the Institute. Comparisons of this kind are a helpful adjunct to other calibration procedures. It may be noted in Table XX that fifteen of the seventeen participating machines are included in this comparison of Concora flat crush data. Shown in Table XX are the Institute and mill Concora averages for each roll included in this comparison. In a few cases mill averages were not submitted for all rolls. In these instances, the current machine average based on Institute data included only those rolls for which mill data were received. The average difference between the current machine average based on Institute data and that based on mill data is shown in Table XX for each machine. For each roll the difference between the average Concora result based on Institute data and that based on mill data is also shown. The plus or minus sign denotes whether the mill average was higher or lower than the Institute average.

TABLE XX

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR OCTOBER, 1959

Machine A

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
A-1	177	9-17-59	42.6	38.4	-4.2
Current Machine Av.			42.6	38.4	-4.2

Machine B

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
B-1	312	9-19-59	37.4	38.5	+1.1
B-2	313	9-20-59	34.8	37.2	+2.4
B-3	314	9-21-59	39.5	40.2	+0.7
B-4	315	10-3-59	35.9	38.0	+2.1
B-5	316	10-4-59	41.0	41.8	+0.8
B-6	317	10-4-59	39.7	39.4	-0.3
B-7	318	10-7-59	34.9	38.3	+3.4
B-8	319	10-7-59	34.8	38.1	+3.3
B-9	320	10-8-59	35.0	39.3	+4.3
Current Machine Av.			37.0	39.0	+2.0

Machine C

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
C-1	20G	9-24-59	30.7	31.1	+0.4
C-2	20G	10-1-59	32.0	31.4	-0.6
C-3	--	10-7-59	33.8	32.4	-1.4
C-4	--	10-13-59	33.6	32.9	-0.7
Current Machine Av.			32.6	32.0	-0.6

Machine D

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
D-1	20G	9-24-59	37.6	37.7	+0.1
D-2	20G	10-2-59	35.6	37.7	+2.1
D-3	--	10-9-59	34.8	35.8	+1.0
D-4	--	10-15-59	35.0	36.6	+1.6
Current Machine Av.			35.8	37.0	+1.2

Machine E

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
E-1	204	9-14-59	37.7	36.4	-1.3
E-2	205	9-15-59	37.2	36.2	-1.0
E-3	206	9-30-59	35.0	32.6	-2.4
E-4	207	10-2-59	34.7	34.2	-0.5
Current Machine Av.			36.2	34.8	-1.4

Machine F

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
F-1	35	9- 1-59	36.7	37.7	+1.0
F-2	107	9-2- 59	33.5	34.0	+0.5
F-3	288	9-4-59	34.8	36.1	+1.3
F-4	709	9- 9-59	34.9	34.1	-0.8
F-5	1333	9-17-59	34.7	34.3	-0.4
F-6	1439	9-19-59	36.7	39.1	+2.4
F-7	1713	9-22-59	36.7	35.0	-1.7
F-8	2209	9-28-59	34.8	36.8	+2.0
Current Machine Av.			35.4	35.9	+0.5

Machine G

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
G-1	21	6-26-59	33.1	39.2	+6.1
G-2	28	8- 3-59	36.5	34.7	-1.8
G-3	29	8- 6-59	35.9	38.9	+3.0
G-4	30	8-10-59	35.6	36.4	+0.8
G-5	31	8-14-59	37.0	35.2	-1.8
G-6	32	8-21-59	35.4	36.4	+1.0
G-7	33	8-28-59	36.0	38.5	+2.5
G-8	34	8-31-59	34.7	39.0	+4.3
G-9	35	9-2-59	31.8	36.2	+4.4
G-10	36	9-9-59	37.7	37.1	-0.6
G-11	37	9-11-59	36.6	37.0	+0.4
G-12	38	9-14-59	33.5	35.3	+1.8
G-13	39	9-16-59	33.6	37.8	+4.2
G-14	40	9-22-59	37.6	39.0	+1.4
Current Machine Av.			35.3	37.2	+1.9

Machine I

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
I-1	506	9-22-59	42.7	42.2	-0.5
I-2	507	9-25-59	36.8	39.0	+2.2
I-3	508	9-30-59	40.3	41.3	+1.0
I-4	509	9-30-59	39.2	39.7	+0.5
I-5	510	10-7-59	39.7	40.2	+0.5
I-6	511	10-9-59	36.8	39.0	+2.2
I-7	512	10-14-59	39.4	41.6	+2.2
I-8	513	10-16-59	40.4	41.9	+1.5
Current Machine Av.			39.4	40.6	+1.2

Machine J

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
J-1	344	9- 8-59	37.4	38.3	+0.9
J-2	345	9-11-59	39.2	37.7	-1.5
J-3	346	9-15-59	41.8	39.7	-2.1
J-4	347	9-17-59	41.0	38.9	-2.1
J-5	348	9-22-59	40.7	38.9	-1.8
J-6	349	9-26-59	41.4	41.3	-0.1
J-7	350	9-29-59	39.6	38.5	-1.1
J-8	351	10-1-59	40.0	39.7	-0.3
J-9	352	10-6-59	38.5	40.0	+1.5
J-10	353	10-9-59	38.3	37.6	-0.7
Current Machine Av.			39.8	39.1	-0.7

[a] The difference given here is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XX—Continued

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR OCTOBER, 1959

Machine K

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
K-1	35	9-23-59	30.6	27.6	-3.0
K-2	36	9-23-59	31.6	24.6	-7.0
K-3	37	10-6-59	33.8	35.2	+1.4
K-4	38	10-6-59	30.8	34.1	+3.3
Current Machine Av.			31.7	30.4	-1.3

Machine L

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
L-1	2689	8-31-59	34.2	35.0	+0.8
L-2	275	9- 3-59	35.2	36.8	+1.6
L-3	618	9- 7-59	33.2	34.6	+1.4
L-4	100	9-16-59	34.0	35.3	+1.3
L-5	1486	9-18-59	34.2	33.9	-0.3
L-6	1963	9-24-59	33.1	35.0	+1.9
L-7	2151	9-27-59	34.1	39.1	+4.9
L-8	2327	9-29-59	34.8	37.3	+2.5
Current Machine Av.			34.1	35.9	+1.8

Machine M

Code	Mill Roll No.	Date Made	Concora Flat Crush, p.s.i. Institute	Mill	Difference[a]
M-1	189	10-7-59	32.6	36.4	+3.8
M-2	190	10-7-59	31.9	35.3	+3.4
Current Machine Av.			32.3	35.8	+3.5

Machine N

N-1	185	9-24-59	34.2	36.4	+2.2
N-2	186	9-24-59	32.2	33.0	+0.8
N-3	191	10-14-59	33.6	34.9	+1.3
N-4	192	10-14-59	31.2	32.9	+1.7
Current Machine Av.			32.8	34.3	+1.5

Machine O

O-1	20G	9-25-59	36.2	34.1	-2.1
O-2	20G	9-30-59	32.6	32.2	-0.4
O-3	--	10-8-59	36.0	34.2	-1.8
O-4	--	10-14-59	32.3	32.3	0.0
Current Machine Av.			34.3	33.2	-1.1

Machine P

P-1	880	8-29-59	47.2	48.1	+0.9
P-2	592	9-21-59	36.2	34.7	-1.5
P-3	668	9-24-59	40.0	34.8	-5.2
P-4	808	9-29-59	37.9	32.9	-5.0
P-5	33	10-2-59	35.2	36.5	+1.3
P-6	67	10-3-59	37.8	36.0	-1.8
Current Machine Av.			39.0	37.2	-1.8

[a] The difference given here is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

The data shown in Table XX are summarized in Part I of Table XXI where for each machine the following information is given: (1) Current machine average based on Institute data, (2) current machine average based on mill data, (3) the average difference--that is, the difference between the current machine average based on Institute data and that based on mill data and (4) the maximum difference encountered in comparing Institute and mill test averages for individual rolls. In Part II of Table XXI the average difference of Part I has been converted to per cent by dividing it by the Institute average and multiplying the result by 100. The average differences in per cent for the current report and the two preceding reports are shown. It may be seen that the highest average difference of 10.8% was associated with Machine M for the current period and the lowest of 1.4% with Machine F. Differences greater than five per cent were noted for Machines A, B, G, L, and M. Only the difference for Machine M was greater than ten per cent. In the majority of comparisons, agreement between Institute and mill data was good.

TABLE XXI

PART I: A COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORA FLAT CRUSH AVERAGES BASED ON INSTITUTE DATA AND THOSE BASED ON MILL DATA

Machine Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
No. of Rolls Compared	1	9	4	4	4	8	14	0	8	10	4	8	2	4	4	6	0
Concora Flat Crush, p.s.i.																	
Current Machine Av.(Institute)[a]	42.6	37.0	32.6	35.8	36.2	35.4	35.3		39.4	39.8	31.7	34.1	32.3	32.8	34.3	39.0	
Current Machine Av.(Mill)[a]	38.4	39.0	32.0	37.0	34.8	35.9	37.2		40.6	39.1	30.4	35.9	35.8	34.3	33.2	37.2	
Average Difference[b]	-4.2	+2.0	-0.6	+1.2	-1.4	+0.5	+1.9		+1.2	-0.7	-1.3	+1.8	+3.5	+1.5	-1.1	-1.8	
Maximum Difference[c]	-4.2	+4.3	-1.4	+2.1	-2.4	+2.4	+6.1		+2.2	-2.1	-7.0	+4.9	+3.8	+2.2	-2.1	-5.2	

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PER CENT) BETWEEN THE CONCORA FLAT CRUSH BASED ON INSTITUTE DATA AND THAT BASED ON MILL DATA

Average Difference, %[d]																	
Current Report (Oct.)	-9.9	+5.4	-1.8	+3.4	-3.9	+1.4	+5.4	—	+3.0	-1.8	-4.1	+5.3	+10.8	+4.6	-3.2	-4.6	--
51st Report (Sept.)	-14.8	+1.4	-8.8	-10.9	-5.0	-3.6	—	—	+2.7	+5.0	-4.8	-1.9	+12.5	+5.0	-11.5	-3.1	--
49th Report (Aug.)	--	+1.3	-16.0	-6.3	-1.6	-12.6	+5.0	—	+1.2	-2.0	-1.1	-7.5	-0.3	-6.1	-2.2	-10.9	--

[a] Comparisons based on current machine average include only those rolls for which mill data were submitted.

[b] Average difference is the difference between the current machine average based on I.P.C. test results and that based on mill test results, with the I.P.C. test results used as the reference. See Table XX.

[c] Maximum difference is the greatest difference encountered in comparing I.P.C. and mill test averages for individual rolls. See Table XX.

[d] Average difference (per cent) is computed by dividing the average difference in p.s.i. (shown above in Part I of this table) by the I.P.C. current machine average and multiplying the result by 100 to obtain the average difference in per cent.

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